



Aligning to Learning
Standards:

Measurement and
Geometry

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NCTM Principals of Math Instruction

- Equity

- Curriculum

- Teaching

- All students must have opportunity and support to learn mathematics
- Coherent, focused on important mathematics, well articulated across the grades . . prepare students to solve problems across settings
- Selecting suitable materials, tools, techniques to support learning & pursuing continuous self improvement



NCTM Principals of Math Instruction

- Learning
 - Build new knowledge from prior knowledge: students learn more and better when they take control of their learning
- Assessment
 - Integral part of instruction . . . guides student learning
- Technology
 - Technology is essential in teaching and learning



Teaching to NCTM Standards: What really works?

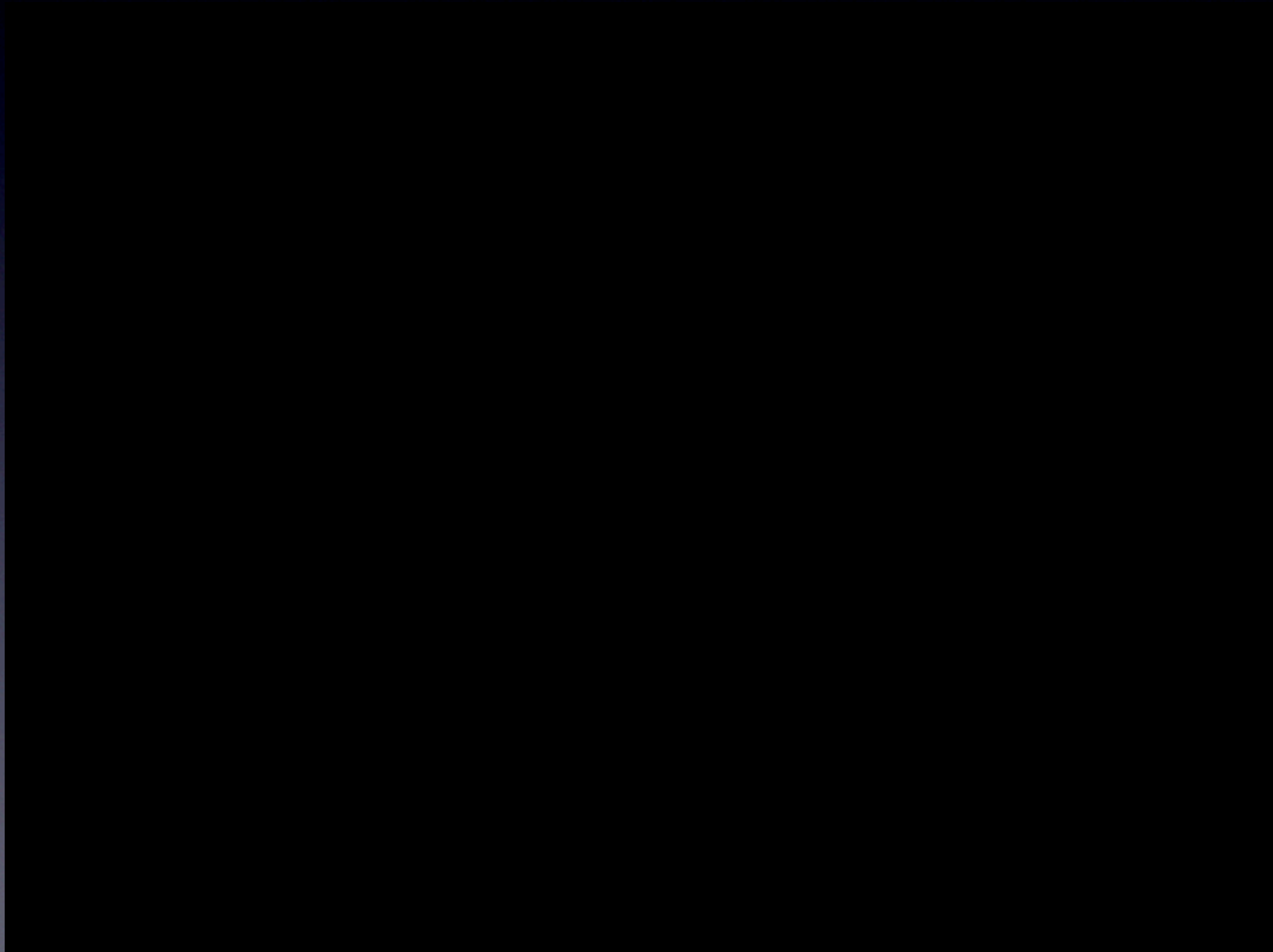
- **5 Component Skills**

- **Number and Operations**
- **Geometry**
- **Algebra**
- **Data Analysis**
- **Measurement**

- **5 Processing Skills**

- **Problem Solving**
- **Reasoning & Proof**
- **Communication**
- **Connections**
- **Representation**

Where is Measurement and Geometry in the World?



Goal 9: Geometry

Key Ideas About Geometry

Analyzing characteristics and properties of shapes

Specifying locations and describing spatial relationships

Applying transformations and symmetry

Using visualization, spatial reasoning, and geometric modeling

Goal 9: Geometry

STATE GOAL 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

A. Demonstrate and apply geometric concepts involving points, lines, planes and space.

B. Identify, describe, classify and compare relationships using points, lines, planes and solids.

Goal 7: Measurement

STATE GOAL 7: Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

A. Measure and compare quantities using appropriate units, instruments and methods.

B. Estimate measurements and determine acceptable levels of accuracy.

Pre-K through 2nd Grade

- Identifying shapes and describing spatial relationships
- Composing and decomposing geometric shapes
- Describing shapes and space
- Ordering objects by measurable attributes
- Developing an understanding of linear measurement and facility in measuring lengths

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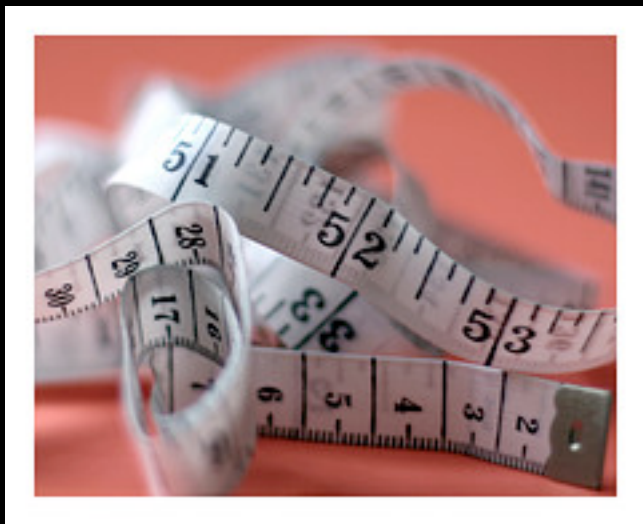
Grades 3 - 5

- Describe and analyzing properties of two-dimensional shapes
- Strengthen their understanding of fractions as as they confront problems in linear measurement that call for more precision
- Select appropriate units, strategies, and tools to solve problems involving perimeter
- Developing an understanding of area and determining the areas of two-dimensional shapes
- Describing three-dimensional shapes and analyzing their properties, including volume and surface area



Grades 6-8

- Problems that involve areas and volumes
- Find areas or volumes from lengths or to find lengths from volumes or areas and lengths
- Developing an understanding of and using formulas to determine surface areas and volumes of three-dimensional shapes
- Analyzing two and three dimensional space and figures by using distance and angle



Grades 6-8

- Geometric ideas of location and distance can be linked to developing algebraic concepts as students apply coordinate geometry to the study of shapes and relationships (parallelism and perpendicularity of sides).
- Pythagorean relationships is applied to the coordinate plane to establish a method of determining the distance between points or the lengths of segments



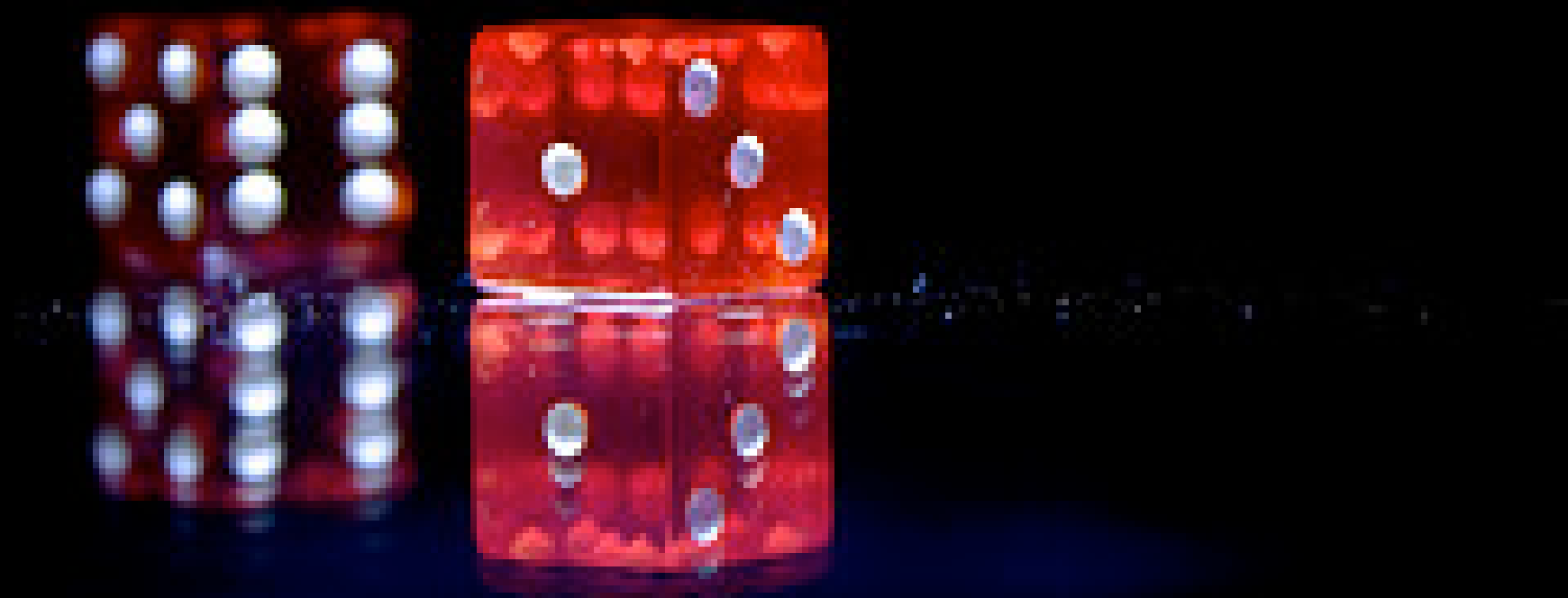
Grades 9-12

- * Extend the Cartesian coordinate to other coordinate systems including polar, spherical, or navigational systems.
- * Apply trigonometric relationships to solve problems involving location, distance, direction and position. This further strengthens the connection of algebra and geometry.

Academic Vocabulary

- Focused direct instruction of key vocabulary words
- Academic Vocabulary Notebooks
- Let's take a look at one strategy: Story Based MathTeaching to Standards Math from Attainment

ACTIVITIES



Solid Figures

- Play Dough for all ages!

Pattern Blocks

- Measuring Area
 - Cover the shape exactly with Pattern Blocks.
 - In how many ways can you do it?
 - Which figures has a greater area
 - ESTIMATE and then check

Pattern Blocks

- Measuring Angles
 - Use smaller angle or wedge of a tan Pattern Block to measure this angle.
 - Use tan wedge, to measure each angle of the polygons shown below
 - Find the sum of the measures of its angles.
 - What do you notice?

Geoboards

- How Many Squares?
 - Make a square with four boundary pegs and one interior peg.
 - Make as many different squares on your geoboards as you can make.
 - Record them on dot paper.

Geoboards

- Changes
 - Make this figure.
 - Change the figure to make another shape that has:
 - the same area and larger perimeter.
 - the same area and smaller perimeter.
- Make three more shapes that have different perimeters but the same area.

Tangrams

- A Spatial Relations Puzzle
 - Use the three smaller Tangram triangles to cover the shapes exactly.
 - Can you make a square with the three smallest triangles?
 - Can you make another 4 sided figure? a 5-sided figure? a 6 sided figure? a 7 sided figure?
 - What other figures can you make with these three triangles?

Tangrams

- A Tangram Riddle
 - The Shape is made from three pieces.
 - The shape has four sides.
 - One of the pieces is not a triangle.
 - Two of the pieces are exactly alike

Color Cubes

- Measuring with a Milk Carton
 - Partner and a carton
 - How do you compare the cubes to the carton? List the ways
 - How many cubes do you think will fit into your carton?
 - How many ways can you figure that out?
 - Use one way and find the number of cubes. Compare your result to your estimation

Base Ten Blocks

- Measuring Area
 - Which do you think has the greatest area? The least?
 - Estimate the number of square centimeters in each figure.
 - Now, using the flat, find and record the area of each figure.
 - Compare your results to your estimations.